United States Environmental Protection Agency
Region IV
POLLUTION REPORT

Date: Wednesday, May 02, 2012
From: David Andrews, OSC

Subject: FINAL POLREP: Completion Of Site Cap & Restoration
Smokey Mountain Smelters
1508 Maryville Pike, Knoxville, TN
Latitude: 35.9191830
Longitude: -83.9264810

POLREP No.:	13	**Site #:**	A4MD
Reporting Period:		**D.O. #:**	00088
Start Date:	6/8/2010	**Response Authority:**	CERCLA
Mob Date:	6/8/2010	**Response Type:**	Time-Critical
Demob Date:	5/12/2011	**NPL Status:**	NPL
Completion Date:	5/30/2012	**Incident Category:**	Removal Action
CERCLIS ID #:	TND098071061	**Contract #**	EPS40704
RCRIS ID #:			

Site Description

The Smokey Mountain Smelters Site was originally a series of fertilizer and agricultural chemical companies which operated from the 1920s to the 1960s. Smokey Mountain Smelters (SMS), also known as Rotary Furnace, Inc., operated at the Site from 1979 to 1994 and has been inactive since that time. The facility was a secondary aluminum smelting operation. The process involved the melting of scrap aluminum and aluminum dross (a waste by-product of primary and secondary aluminum smelting) and casting the molten aluminum ingots. Raw materials at the facility primarily consisted of scrap aluminum and aluminum dross. Waste material from the SMS operation was primarily saltcake, a residue from dross smelting with high salt and low metal content. Other waste materials included baghouse dust and discarded aluminum dross. Much of the Site is covered in a waste pile consisting of saltcake and aluminum dross that was dumped directly on the land surface without a liner or drainage controls.

In 1983, the Tennessee Department of Health & Environment (DHE) Division of Solid Waste Management issued a notice to SMS with the conclusion that the Site was "unsuitable for use as an industrial landfill;" however, landfilling on-site continued to occur for several years afterward. In addition, the Knox County Department for Air Pollution Control (KCDAPC) documented numerous citizen complaints regarding excessive air emissions from the Site and cited SMS for several air quality violations in the 1980s.

The total SMS Site is approximately 13 acres in size and includes one large industrial process building, a small lagoon, a large outside saltcake waste pile, and three mid-sized indoor dross waste piles. The process building is approximately 100 feet wide by 300 feet long, and 50 feet high; it houses some equipment and three 900 cubic-yard (each) piles of aluminum dross. Portions

of the north and east walls of the building have collapsed. The spring-fed lagoon measures approximately 25 feet wide by 100 feet long and is located to the southeast of the process building. The saltcake waste pile is approximately 50,500 cubic yards in size and covers an area of about 4 acres on the south side of the process building. Surface runoff from the Site generally flows to the southwest. Leachate and surface runoff discharges to an unnamed tributary stream, reaching Flenniken Branch and eventually the Tennessee River.

Multiple sampling events between 1997 and 2006 have been conducted at the Site to characterize the composition and contaminant concentrations in the waste piles, the raw material piles, the on-site lagoon, leachate to the unnamed tributary, and downstream impacts to the unnamed tributary and Flenniken Branch. Dross and saltcake are exothermically water-reactive materials that release heat and ammonia gas, and leach aluminum, ammonia, chlorides, and other contaminants.

In 1997, the Tennessee Division of Superfund (DSF) collected surface water and waste samples at SMS. Elevated levels of ammonia, arsenic, lead, and aluminum were found in surface waters at the Site. Elevated levels of aluminum, PAHs, heptachlor, heptachlor epoxide and ammonia were found in the on-site waste pile. Headspace air samples over the waste pile measured elevated concentrations of ammonia. DSF collected additional samples from the Site in 2001, 2003, and 2004 to monitor ongoing surface water conditions. In 2006 EPA Environmental Response Team also conducted a removal site evaluation collecting surface soil, samples from the dross and saltcake stockpiles, and surface water from the unnamed tributary. Analysis of these later samples showed that contaminant concentrations in surface waters leaving the Site had increased for arsenic, lead, and aluminum. Elevated levels of chlorides were found in surface waters leaving the Site that were significantly above background levels. Elevated concentrations of ammonia, chlorides, and pH were found along the entire length of the unnamed tributary to the Flenniken Branch downstream of the Site.

A residential apartment community (560 units) is located 75 from the southern boundary of the Site fenceline. During a 2008 Site visit the EPA OSC observed that access controls were not adequate to keep trespassers out of the property. A few breeches and pathways have been found in the fenceline on the southern boundary that allows access to the site from the appartment complex. A time critical removal action was initiated to provide stronger security measures in order to keep trespassers away from the water-reactive dross material, and collect additional data to determine if further waste removal or treatment action is necessary.

Current Activities

June 8, 2010 ERRS mobilized equipment, personnel, and established the site trailer. Emergency Rapid Response Service (ERRS) contractors conducted grubbing (brush clearing), removal of asbestos containing material (ACM), and the first phase of the building demolition. Panels of ACM were removed from the north side of the building. Scrap metal was removed from the dilapidating south side portion of the facility. Radiological sweep of the property was conducted
• June 15, 2010 a site survey was performed to varify property boundaries. Surveyors marked property lines with staked flags and spray paint. 24-hr security service established on site.
• June 30, 2010 ERRS personnel completed demolition of the large former facility building on-site and continued to conduct grubbing (brush clearing) and removal & disposal of asbestos containing material (ACM). Erosion and sedimentation best management practices (BMPs) were installed at the western end of the site next at the head of an unnamed tributary to minimize the impact of surface water runoff from the cleared areas of the site. The Superfund Technical Assessment and

Response Team (START) contractor was tasked to evaluate options for treatment and disposal of the aluminum dross and saltcake material.
• June 14 - August 4, 2010 - Scrap metal from the building demolition was cut and shipped off to Tennessee Metal. 40-truck loads totaling approximately 583 scrap tons of metal has been recycled with a recovered cost of $71,938.00.
• August 16 – 24, 2010 - the demolition non-recyclable structural debris was shipped off-site for disposal to Chestnut Ridge Landfill (Sub-Title D). 63-truck shipments totaling 433-tons were logged on non-hazardous manifests.
• August 24 -27, 2010 - EPA Environmental Response Team (ERT) conducted a radiological assessment of the site after concerns over elevated readings from two ERRS worker's thermoluminessent dosimetry (TLD) badges workers for the month of July work period. Upon notification of the July TLD results, and per the site Health and Safety Plan, the OSC halted site operations (Aug 23) and ERT mobilized a Certified Health Physicist (CHP) and contractor support to address the concerns through radiological screening of the site and collecting samples to be evaluated at the RERT (Montgomery, AL). Two ERRS workers were rotated off the SMS site per the site Health & Safety Plan (HASP). The July TLD results (July 5 to Aug 4) reported approximately half of the (quarterly) dose equivalent permissible limit for the two ERRS workers. ERT did not identify any areas of concern at levels above background (50 microR/hr) in the work zone(s). The results mirrored the July 2007 radiological screening by ERT and REAC that identified the fire-brick (smelter ovens) as a source for elevated readings as well as the northeast corner of the property near a rail spur. ERT issued all site personnel electronic radiological dosimeters (EPD) to be worn for the remainder of the removal and site work. The data from the July TLD badges was also brought into question due to the results of the control ("blank") badge indicated that it was exposed and the type of TLD (worn as a ring) that is susceptible to perspiration which can interfere with the TLD film.

REMOVAL OPERATIONS NOTE: Two attempts - August 10-11 and September 15-16, 2010 18-test loads (Approx 270 tons) from the saltcake piles from the open air landfill (central site) and the waste piles located under the cover of the former building were evaluated for potential aluminum recovery by Tennessee Aluminum Processors in Mt Pleasant, TN. The yield of the aluminum recovery was not enough to offset the process cost for recycling the waste material. Transportation costs to Mt. Pleasant were also a major factor in the consideration. The remaining disposal option for the waste piles is off-site disposal in a Sub Title D landfill (Knoxville & Athens, TN) under a special waste provision by TDEC. Due to the potential reactivity of the material, it was later determined that cost to provide a special disposal cell at a prospective landfill location was also cost prohibitive. The remaining option was to transfer as much saltcake material to the concrete pad that was the footprint of the former SMS production building that provided about 7,500 square yards of an impermeable surface to stockpile saltcake and will also provide an easy access to the saltcake if an off-site recycling option becomes a possibility in the future.

• September 22, 2010: Final Rule No. 50 and Smokey Mountain Smelters is amongst six (6) sites added to the National Priorities List (NPL).

• Sept 20 – Nov 8, 2010: Transfer of aluminum smelter waste from the leading edges and crests of the waste pile areas to the concrete pad (building footprint) has been completed. Approximately 517 truck-loads (8,300 cu yds) has been transferred to the concrete foundation and footprint of the former main building which serves as an impermeable platform for the waste.

• November 2, 2010: A consultant (Terracon) was brought-in to evaluate the site and propose a

plan to stabilize the site to minimize or stop the leachate discharge from the waste-pile. The OSC approved ERRS to move forward with the recommendations by the consultant for site stabilization.

OPERATIONS NOTE:
November 8 – Consultant's recommendations will be implemented as follows: In lieu of off site shipment and disposal of the saltcake, the material will be transferred to the stockpile on the concrete pad (former main building footprint) to extent practical and grade the remaining material and site surface to minimize the erosion & sedimentation. Drainage channels will be installed on the northern and southern boundary of the site and one in the middle and lined with concrete from the building demolition that will be hammered (hoe-ram), size-modified for use as rip-rap and installed in the drainage channels. Trees and brush grubbed during site preparation will be installed on the periphery slopes of the waste piles to stabilize and control erosion. A 6-inch clay cap and top soil seeded with mixed grasses will complete the remedy.

• December 16, 2010: Additional funding through a Ceiling Increase and Change of Scope Action Memorandum was approved. The approved funding will support the costs necessary to complete construction of diversion drainage channels through and around the site and install a clay and vegetative cap. These measures were designed to ultimately control leachate run-off from the waste field and stabilize the conditions at the site. After transfer of the site to the Remedial Branch the site controls will allow time to design and implement a long-term remedy for the site.

Jan 3: ERRS and EPA remobed to Site after year-end holiday demobe. Work continues with focus on grade and drainage adjustment.
Jan 5: ERRS ships off-site the tire stockpile. During excavation and grading tires were recovered that were part of the site associated with a C&D landfill.
Jan 6: ERRS conducts a dye test with TDEC to determine subsurface water flow.
Jan 10 thru 12: Site shut-down due to snow & ice.

• January 2011 through March 21, 2011: Production of rip-rap from concrete that was scrapped from the building demolition and site-clearing. Rip rap/ concrete boulders transferred across site and installed on the trenches excavated along the southern rim of the waste pile and site.

The site was gradded for optimum surface water drainage and preparation for installation of the clay cap on top of the aluminum smelting waste piles. Clearing and grubbing of the southern site area (Rimmer Brothers property) was completed, and the drainage channel for that area was improved by deepening it and lining it with rip-rap made from concrete already on-site.

Construction of erosion and drainage controls and dismantling and decontamination of an underground storage tank (UST) has been completed. Recent heavy rain events saturated the soils and continue to make site conditions difficult for managing heavy equipment.

Grade adjustment of the saltcake pile and construction of the diversion channels have been completed as of March 21, 2011.

• Excavation and reflection ("indentation") of the leachate outfall at the extreme southern toe (Remmer Brothers property) has been completed. The indentation is part of the pre-capping design to modify flow from the outfall.

A hydrogeologist from the Environmental Response Team (ERT) visited the site to consult with the OSC and RPM regarding current removal and future remedial activity anticipated at the site. Specifically, what may have been the native drainage/springs across (under) the site and what considerations that may optimize remedial actions after the removal phase is completed.

Approximately 4,000-gallons of fuel oil was transferred out of a UST and into a poly-frac-tank for oil/water separation. The tank was discovered under the waste pile in the Fall 2010. After the oil/water phases out the oil will be shipped off-site to a used oil vendor. The sludge will be land-farmed on site.

Fallen trees and brush were installed along the rim of the site. The brush will serve as a decaying barrier and amend erosion control per the cap design

The northern and southern diversion trenches were grade adjusted for flow to the southern toe of the site where the drainage will converge with the leachate outfall. Rip-rap was produced on-site from structural concrete from the former Main Building. Additionally, the crown of the site was graded in a 10:1 slope to minimize contaminant run-off.

Scrap tires and scrap steel/iron continue to be collected and disposed.

• April 13 through May 3, 2011: 59-loads (approx 16 cu yds/load) of clay and top soil were delivered and graded onto the site including the stockpile on the former building footprint. Note: Severe weather including hail damage occurred on April 29th.

• May 9 – May 12, 2011: ERRS subcontractor completes hydroseeding the 4-acres of cap and ERRS demobed personnel and equipment. The Remedial Branch and contractors began to conduct assessment work on site.

OPERATIONS NOTE: Drought conditions prohibited complete germination of the hydroseed. ERRS applied water on several occasions in June 2011 with minimal germination results. October 2011 ERRS procured a company out of Sevierville, TN to apply waste mulch to amend the cap. The OSC directed ERRS to reapply seed in February-March 2012.
May 2012: ERRS will mow the site (mid-month) and will complete conditions under the Statement of Work under Delivery Order 0088 and Removal Action by May 30, 2012.

Planned Removal Actions
One or two mowings of the cap in May 2012 will complete the removal action.

Next Steps
The Region 4 Remedial Branch will continue assessments and any future work on the site.

Key Issues
It was discovered during the removal that the saltcake infill on the property was mounded on top of a landfill that contained cross-ties, construction and demolition deberis and tires. ERRS removed as many tires as practical during this removal action.

The primary goal of this removal action was the hope of recycling the saltcake/ dross waste.

Unfortunately, recycling the saltcake and dross waste and/or (alternatively) off site shipment and disposal were dropped as options because of cost. The stockpile of saltcake that was placed on the former building concrete foundation and thin clay cap will prohibit infussion into the ground of leachate from the saltcake and provide an easy access to to the waste material if a future recycling remedy becomes available. The leachate pond at the toe of the site has been monitored and has yet to produce any visable leachate. The diversion channels have worked well through several heavy rain events and the cap has maintained it's integrity even with the minimal germination of the vegetative cap.

Estimated Costs *

	Budgeted	Total To Date	Remaining	% Remaining
Extramural Costs				
ERRS - Cleanup Contractor	$2,487,500.00	$2,146,067.00	$341,433.00	13.73%
START	$240,925.00	$228,852.00	$12,073.00	5.01%
Intramural Costs				
Total Site Costs	$2,728,425.00	$2,374,919.00	$353,506.00	12.96%

* The above accounting of expenditures is an estimate based on figures known to the OSC at the time this report was written. The OSC does not necessarily receive specific figures on final payments made to any contractor(s). Other financial data which the OSC must rely upon may not be entirely up-to-date. The cost accounting provided in this report does not necessarily represent an exact monetary figure which the government may include in any claim for cost recovery.

Disposition of Wastes

Disposal consisted of several phases which included:
1-) Segregation of scrap iron and sheet metal from the demolition of the main building and off-site shipment for metal recycling.
2-) Disposal of the non-recoverable rubble/demolition debris.
3-) Scrap tire disposal.
4-) Approx 900 gallons oil/water mix recovered from a 20,000 gallon UST unearthed during site grading.
5-) At this time, the aluminum smelter waste ("saltcake") has been evaluated as not containing enough recoverable material to ship off-site for process & dispose in a feasible manner under the current removal budget.